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Civil Engineering

**DESIGN AND CONSTRUCTION STANDARDS
AND EXECUTION OF FACILITY
CONSTRUCTION PROJECTS**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFR 32-10, *Installations and Facilities*; Military Handbook 1190, *Facility Planning and Design Guide - Technical Guidance*; and Military Handbook 1008, *Fire Protection for Facilities - Engineering, Design, and Construction*. It provides general design criteria and standards; procedures for developing engineering technical letters (ETL) and technical data publications; guidance on selecting architect-engineering firms; and information on design and construction management. Send comments and suggested improvements on AF Form 847, **Recommendation for Change of Publication**, through channels, to HQ USAF/CEC, 1260 Air Force Pentagon, Washington DC 20330-1260. **Attachment 1** is a glossary of references, abbreviations, acronyms, and terms.

SUMMARY OF REVISIONS

This issuance aligns the instruction with AFR 32-10.

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Chapter 1

POLICY AND GENERAL STANDARDS

1.1. Applicability:

1.1.1. This instruction contains criteria for design and construction of facilities on Air Force installations (except family housing). Family housing criteria are contained in AFI 32-6002, *Family Housing Programming, Design, and Construction* (formerly AFR 88-25), and Military Handbook 1190, *Facility Planning and Design Guide*. The criteria in this chapter apply to all construction regardless of funding and also apply to:

- Properties listed or eligible for listing on the National Register of Historic Places.
- Air National Guard and Air Force Reserve projects constructed on Air Force installations (Reserve and Active).
- Air National Guard and Air Force Reserve projects constructed on non-DoD property.

1.1.2. These criteria apply to all Air Force installations in the fifty states, the District of Columbia, Puerto Rico, US territories and possessions, and as far as practical, at Air Force installations in foreign countries. In foreign countries, use local materials and construction methods if they produce economical, energy efficient and safe facilities.

1.2. Space Criteria. Use AFH 32-1084, *Standard Facility Requirements Handbook* (formerly AFR 86-2), to determine space requirements instead of Military Handbook 1190. For Air National Guard facilities, use ANG (AF) 86-2, *National Guard Planning Factors*.

1.3. Design Excellence. Excellence in design is a primary goal for all construction projects. Reaching this goal requires a commitment by designers and administrators to quality architecture. Design new facilities in harmony with the architectural character of existing facilities and the environment.

1.3.1. Pay particular attention to: siting, economy, life cycle cost, functionality, energy conservation, interior and exterior details, and disabled access.

1.3.2. Take special care to avoid adversely affecting the historic value of property listed (or eligible for listing) on the National Register of Historic Places, or located within the boundaries of an Historic District.

1.4. Design Flexibility. The Air Force usually owns and operates facilities from the time of construction until the end of the structure's useful life. Over that period, the functional requirements of a building may change drastically. For this reason, flexibility is a major design requirement for all buildings.

1.5. Selection of Materials and Components. Select economical materials by considering:

- Life cycle costs.
- Functional requirements.
- Fire safety.
- Expected length of use.

- Energy conservation and environmental factors (including renewable energy sources, local climatic conditions and construction practices).
- Environmental factors.
- Appearance.
- Maintainability.
- Recyclable materials (refer to AFI 32-7080, *Pollution Prevention Programs* (formerly AFR 19-15)).

Use standardized structural, mechanical, and electrical systems and equipment wherever practicable.

1.6. Categories of Construction. To ensure the right kind of construction is programmed, classify each project in one of four categories of construction.

1.6.1. **Permanent.** This category of construction is required for most facilities at Air Force installations in the United States. and its possessions. Permanent facilities:

- Use design and construction quality suitable for a facility with a minimum life expectancy of 25 years with low maintenance requirements.
- Show reasonable cost, justified by a life-cycle cost approach.
- Use energy-efficient, environmental-, health-, and fire-safe design and conform to the requirements for non-combustible construction.

1.6.2. **Semipermanent.** Semipermanent facilities are used during peacetime in US possessions, where permanent construction is not economically justified; where structures have a high potential for obsolescence; and in foreign countries according to mutual intergovernmental agreements. Semipermanent facilities:

- Are structurally sound, energy efficient, and fire-, environmental- and health-safe.
- Cost less to build than permanent construction.
- Have a life expectancy more than 5 but less than 25 years with moderate maintenance.
- Normally use economical masonry, steel, or wood frame components.
- Are easy to maintain with economical but serviceable finishes.

1.6.3. **Temporary.** Temporary facilities are low-cost structures for temporary use (less than 5 years) at Air Force installations worldwide, where the cost of operation may be relatively high, but maintenance is not a primary design consideration. Use of combustible materials is allowed, consistent with safeguarding life and property.

1.6.4. **Protective.** Protective construction uses passive methods and materials to:

- Reduce or nullify the effects of an attack on an installation
- Enhance recoverability of the installation after attack.

1.6.4.1. Protective construction includes:

- Separating and duplicating structures and activities.
- Strengthening (hardening) structures.

- Camouflaging or "toning down" painting.
- Physical protection against chemical, biological, and radiological agents.

1.6.4.2. Protective construction does not include all elements of passive defense, such as control of electronic emissions, use of protective clothing, and so on.

1.7. Preservation of Historic Resources:

1.7.1. **Requirements for Compliance.** DoD Directive 4710.1, *Archaeological and Historic Resources Management*, provides policy, prescribes procedures, and assigns responsibilities for managing archaeological and historic resources in and on waters and lands under DoD control. *The Secretary of Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* may also apply; consult AFI 32-7065, *Cultural Resources Management*.

1.7.2. **Required Coordination.** Coordinate all activities involving historic properties with the State Historic Preservation Officer. After coordination, obtain the comments of the Federal Advisory Council on Historic Preservation (reference 36 CFR 800, *Protection of Historic and Cultural Properties*).

1.7.3. **Historic Preservation Plan and Archaeological Survey.** Coordinate all construction, maintenance, repair, rehabilitation, alteration, or addition work to a district, site, building, structure, or object with the installation Historic Preservation Plan for possible adverse effects. When appropriate, conduct archaeological surveys to verify whether archaeological features are present at construction sites.

1.8. Voluntary Standards. When practicable, use commercial voluntary standards instead of Government-developed standards and specifications.

1.9. Model Building Codes. Comply with Air Force standards for design and construction and Military Handbook 1190. If applicable standards are not available, comply with the current edition of the Building Officials and Code Administrators code. For Air National Guard facilities, design to the locally-applicable standard building code. Comply with local building codes where practical when constructing within urban areas. In case of a conflict between Air Force standards and local building codes, the more stringent requirement shall apply.

1.10. Air Force Occupational Safety and Health Program. AFI 91-301, *The US Air Force Occupational Safety, Fire Prevention, and Health Program* (formerly AFR 127-12), establishes the Air Force Occupational Safety and Health (AFOSH) program. The AFOSH program applies to all levels and organizations of the Air Force. AFI 91-302, *Air Force Occupational Safety and Health Standards* (formerly AFR 8-14), establishes Air Force occupational safety and health standards. If no applicable standard is available, refer to Occupational Safety and Health Administration (OSHA) standards. If no applicable OSHA standard is available, refer to nationally recognized sources of health and safety criteria.

1.11. Fire Protection. This instruction implements Military Handbook 1008, *Fire Protection for Facilities Engineering, Design, and Construction*.

1.12. Life Cycle Cost. Base design decisions on life cycle cost considerations. Studies must balance initial construction cost with the operating and maintenance costs over the anticipated life of the facility to

provide facilities at optimum cost. The anticipated life of the facility may exceed the 25 year minimum life expectancy for permanent construction.

1.13. Economic Analysis. Conduct economic analyses routinely during the design process to ensure that design alternatives are based on the total cost of ownership. Use the present value discounting approach described in AFI 65-501, *Economic Analysis and Program Evaluation for Resource Management* (formerly AFR 173-15), and AFP 178-8, *Economic Procedures Handbook*, unless otherwise specified.

1.14. Asbestos Materials. Use of asbestos-containing materials may result in excessive exposure for construction and maintenance personnel or building occupants. When exposure to asbestos fibers may occur from maintenance, repair or demolition operations, notify the Bioenvironmental Engineering Services office, and follow requirements and work practices in:

- AFI 32-1052, *Facility Asbestos Management* (formerly AFR 91-42).
- AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Prevention, and Health Program* (formerly AFR 127-12).
- The *Occupational Safety and Health Act of 1970* (29 CFR 1926.58).
- EPA 40 CFR 763G, *Asbestos Abatement Projects*.

1.14.1. Asbestos Removal Projects. Where the Bioenvironmental Engineering Services office determines that asbestos-containing materials pose a hazard, remove these materials. The Bioenvironmental Engineering Services office approves methods and procedures.

1.14.2. Substitution Studies. Where using nonfriable asbestos-containing material may result in worker or building occupant exposure above OSHA or Environmental Protection Agency (EPA) standards and guidelines, conduct a substitution study to justify its use. Carefully evaluate each planned use of asbestos-containing material to determine if an asbestos-free material can be used. Compare costs, performance characteristics, and actual or potential health hazards (including eventual demolition or removal at the end of the item's life) for each material. When an asbestos-containing material is clearly superior in performance and cost and doesn't present a health hazard to workers or building occupants, use the asbestos-containing material. When performance and cost for an asbestos-containing material nearly equals an asbestos-free material, use the asbestos-free material.

1.14.3. Documentation. Document all asbestos materials identified in facilities by the Base Civil Engineer and the Bioenvironmental Engineering Services office. Keep files, reports, studies, or other documents about asbestos.

Chapter 2

AIR FORCE ENGINEERING TECHNICAL LETTERS (ETL) AND TECHNICAL DATA

2.1. Engineering Technical Letter:.

2.1.1. **Purpose.** The ETL system provides specific design guidance, procedures, criteria, and standards.

2.1.2. **Applicability.** ETLs apply to all facilities constructed on Air Force installations except for family housing. ETLs are directive and apply to all levels of command, unless stated otherwise. An ETL remains in effect as long as it states, or until canceled, rescinded, or superseded by a later ETL. ETLs are distributed to major commands, design agents, and other special interest organizations.

2.1.3. Responsibilities:

2.1.3.1. HQ USAF/CE Field Operating Agencies:

- Determine need for ETLs.
- Prepare and approve ETLs in the sample format ([Attachment 2](#)).
- Transmit draft ETLs to Headquarters, Air Force Civil Engineer Support Agency, Systems Engineering Directorate (HQ AFCESA/EN).
- Review ETLs annually for currency and rewrite as necessary.

2.1.3.2. HQ AFCESA:

- Manages the ETL system for The Civil Engineer, Headquarters United States Air Force (HQ USAF/CE).
- Validates, prints, and distributes all ETLs.
- Assigns ETL numbers and maintains the index.

2.2. Technical Data (Techdata). Local reproduction of HQ USAF/CE techdata is authorized.

2.2.1. **Purpose.** Techdata assists requirements planning by forecasting Air Force Civil Engineer-specific technologies that DoD or Air Force research, development, and acquisition activities are researching, developing, testing, or evaluating. Technology areas include:

- Facility energy.
- Heating, ventilating, and air conditioning.
- Corrosion control.
- Pavements.
- Water treatment and conditioning.
- Fire fighting (crash, fire, and rescue).
- Civil engineering tools and equipment.

- Environmental research (pollution prevention; transport and disposal of air, ground, and water pollutants, hazardous materials abatement; site remediation; and natural resources preservation and protection).
- Survivable structures (fixed and deployable).
- Construction and environmental remediation cost management
- Base recovery after attack and rapid runway repair.
- Explosive ordnance disposal.
- Facility disaster control and damage recovery.
- Civil engineering relocatable deployment equipment and processes.
- Human factors, including air base operability training.
- Civil engineering information management technology.

2.2.2. **Requirements.** HQ USAF/CE established requirements for the research, development, and acquisition community to satisfy civil engineering wartime and peacetime needs:

2.2.3. **Responsibilities.** Same as for ETLs (paragraph [2.1.3.](#)), but use format in [Attachment 3.](#)

Chapter 3

SELECTING ARCHITECT-ENGINEERING (A-E) FIRMS

3.1. Scope. This chapter provides detailed guidance for selecting A-E firms and negotiating contracts at active Air Force and Air Force Reserve installations. It implements 40 U.S.C. 541-544, Federal Acquisition Regulation (FAR) subpart 36.6, and the applicable portions of Defense FAR Supplement (DFARS) and Air Force FAR Supplement (AFFARS). The Air National Guard complies with ANG (AF) 88-1, *Criteria and Standards for Air National Guard Construction*, through the US Property and Fiscal Office in each state.

3.2. Definitions. FAR 36.102 provides definitions of professional and other A-E services. Other definitions:

- *Title I:* These services are related to a specific construction project and consists of conducting field surveys and investigations to obtain design data, and preparing contract plans, specifications, and cost estimates.
- *Title II:* These services are related to a specific or proposed construction project and consists of supervision and inspection of construction.
- *Base Comprehensive Plans:* These services consist of conducting field surveys and investigations to obtain data and producing Air Base development plans.
- *Other A-E Services:* These services are design and construction related but are not connected with a specific construction project. The services consist of developing design criteria, fact finding studies, surveys, investigations, and the performance of environmental projects involving prevention, compliance, and restoration when the services of registered architects or engineers are required. Excluded are services that need not be performed by a registered engineer or architect such as providing design and construction equipment or computer programs.

3.3. Authorities:

3.3.1. Title 10, U.S.C., sections 2807(a) and 9540(a), authorizes contracting for and administration of A-E services for project design. Title 10, U.S.C., section 9540(b) limits the portion of the A-E's fee for producing contract plans and specifications to 6 percent of the estimated cost of the construction project. This doesn't include site investigations, studies, and surveys.

3.3.2. Title 40, U.S.C., paragraphs 541-544, the *Brooks Act*, provides the authority, definitions, and basic procedures for the Federal Government's selection of A-E firms for professional services on facilities projects. Title 10, U.S.C., section 2855(a) applies the *Brooks Act* to military construction.

3.3.3. FAR subpart 36.6 implements the *Brooks Act* by providing detailed procedures for:

- Submitting A-E qualification data and performance evaluations.
- Functioning of evaluation board(s).
- A-E selection criteria.
- A-E selection approval.
- Contract negotiation.

- Government cost estimates.

It also covers clauses on responsibility for redesign and liability for design errors or deficiencies, design within funding limitations, oversight of A-E's work, and registration of designers.

3.3.4. DFARS subpart 236.6 adds to the FAR:

- Selection criteria based on A-E expertise and experience, status as a small or small disadvantaged firm, and the volume of previous DoD work.
- A special approval requirement when the design contract cost exceeds \$500,000.
- Application to Military Construction (MILCON) of provisions for small business set-aside when the design contract cost is less than \$85,000 [10 U.S.C. 2855(b)].
- Notifying Congress when the estimated A-E fee is \$300,000 or more [10 U.S.C. 2807(b)].

3.3.5. Advance approval of the Deputy Under Secretary of Defense (Environmental Security) is required to use a cost plus fixed fee (CPFF) contract estimated to exceed \$25,000.

3.4. Responsibilities:

3.4.1. Civil Engineer and Contracting Officer:

<u>ACTION</u>	<u>OPR</u>
Develop requirement, SOW	Civil Engineer
Announce requirement for A-E services	Contracting Officer
Receive qualification statements from A-Es	Contracting Officer
Evaluate A-E firms	Civil Engineer
Approve A-E slate	Civil Engineer
Notify selected A-E firm	Contracting Officer
Negotiate A-E fee and execute contract	Contracting Officer

3.4.2. **Preselection Board.** When the estimated A-E fee exceeds \$25,000 (the small purchase limit), this board:

- Develops an evaluation procedure and conducts an evaluation of A-E candidates.
- Recommends three to six qualified A-Es to the selection board in a summary report.

3.4.3. **Selection Board.** This board of registered engineers and architects:

- Evaluates and may interview the A-E firms on the preselection board list.
- Recommends three firms for selection authority approval.

3.5. Procedures:

3.5.1. The preselection and selection boards decide the specific professional qualifications and capabilities necessary to accomplish the statement of work. The boards base their evaluations on:

- Information in the SFs 254, 255, and 1421 (or the DD Form 2631) from previous projects.

- Other data submitted per the Commerce Business Daily (CBD) synopsis.
- Interviews with A-E firms.

3.5.2. The boards use the same procedures for all A-E firms considered. While the boards may modify evaluation factors or add them (if they're stated in the CBD announcement) for a project, the boards must consider these essential factors listed in FAR 36.602-1 and DFARS 236.602-1:

- Professional qualifications.
- Specialized experience and technical competence.
- Capacity for timely accomplishment of work.
- Past performance.
- Geographic location.
- Volume of DoD work the candidate has done.

3.5.3. The preselection board reviews all candidates and sends its recommendations to the selection board, which interviews each firm, either in person, by telephone, or by written reply to written questions. Interviews cover:

- Required services.
- The firm's technical qualifications and experience with similar work.
- The firm's organization, capacity, and current workload.
- Key individuals who will work on the project.
- Design concepts the firm intends to use.
- The relative value of alternative approaches.

3.5.4. Either short selection process described in FAR 36.602-5 may be used to select firms for contracts not expected to exceed the small purchase limitation (AFFARS 5336.602.5).

3.5.5. The chairperson of each board must be a registered professional engineer or architect. The chairperson:

- Prepares a summary report of board activities, marked FOR OFFICIAL USE ONLY.
- Screens prospective board members to avoid potential conflict of interest.
- Uses careful judgment when assigning non-US. employees to boards.

3.5.6. A person may not be a voting member of both boards for the same project.

3.5.7. The Contracting Officer or his designee is a nonvoting member of the final selection board.

3.6. A-E Slate Selection Approving Authority. Approval authority for A-E slate selections is delegated as follows:

3.6.1. For Title I, Title, II, and Base Comprehensive Plan A-E services where the fee exceeds \$500,000, The Civil Engineer, Headquarters US Air Force (HQ USAF/CE) is the A-E slate selection approving authority for Headquarters Air Force Center for Environmental Excellence (HQ AFCEE) and Headquarters Air Force Civil Engineer Support Agency (HQ AFCESA) contracts. When the fee

is less than \$500,000, the Commander (HQ AFCEE/CC or HQ AFCESA/CC) may approve the slate selection.

3.6.2. For Title I, Title II, and Base Comprehensive Plan A-E services where the fee exceeds \$500,000, the Major Command (MAJCOM) Civil Engineer is the A-E slate selection approving authority for MAJCOM contracts. When the fee is less than \$500,000, the MAJCOM may delegate selection slate approval authority to the Base Civil Engineer.

3.6.3. For other A-E services contracts where the fee exceeds \$300,000, Deputy Assistant Secretary/Installations (SAF/MII) is the A-E slate selection approving authority. When the fee is less than \$300,000, HQ USAF/CE is the A-E slate selection approving authority.

3.6.4. The maximum A-E fee permitted under a contract is the basis for approval level and authority. On Indefinite Delivery/Indefinite Quantity (IDIQ) contracts, base the fee on the initial plus renewal values of the contract. For example, a 2-year, \$400,000 per year, IDIQ contract by a base would have a potential value of \$800,000, and require approval by the MAJCOM Civil Engineer.

3.6.5. All contracts requiring HQ USAF/CE or SAF/MII approval need two written approvals: the requirements, and the slate. Submit the following for approval. All approving authorities should review similar data before approving a slate.

3.6.5.1. Obtain approval of the requirement before procurement action, submitting an explanation of why the work is needed, the basis for the contract scope, the length of the contract, and the minimum and maximum quantity of work allowed under the contract. Include with the approval request a copy of the draft notice for the CBD, and the proposed selection factors and criteria and their weighted values.

3.6.5.2. To ensure selection boards were professionally qualified to evaluate the A-E firms and the process was fair and equitable, slate approving authorities should review the following data before granting approval:

- A copy of the CBD announcement.
- A copy of the contract statement of work.
- Preselection and final selection board minutes.
- A listing of all board members by name, grade, professional discipline, organization, and whether members were registered as an architect or engineer.
- The letter of designation.
- A listing of all firms considered by the final selection board, including their status as a small or disadvantaged business, if applicable.
- The selection factors and criteria and their weighted values.
- Board member scorecards.
- Summary of members scoring and ranking of firms.
- Questions asked during A-E interviews.
- The slate in rank order.

3.7. Indefinite Delivery-Indefinite Quantity Contracts:

3.7.1. **Applicability.** AFFARS 5336.691 provides for IDIQ A-E contracts when the Government:

- Has a variety of small and recurring requirements involving maintenance, repair, and minor construction, but can't produce a definite statement of work.
- Can't determine prior to the contract the precise quantities (above a specified minimum) of A-E services needed during the contract period.
- Will not benefit by committing early to more than a minimum quantity.

NOTE: Requirements above the stated minimum quantity are obtained and funds obligated by separate delivery orders.

3.7.2. General Guidance for Fulfilling IDIQ Contracts:

3.7.2.1. Create and publish a CBD synopsis which describes the type of work requiring A-E services and the total amount of work anticipated.

3.7.2.2. Describe the initial increment work order fully in the synopsis, and make it a part of the initial award.

3.7.2.3. Under this type of contract, the contractor earns a minimum fee as per FAR 16.504.

3.7.2.4. The delivery order (which may include one or more work orders) limitation must comply with AFFARS 5336.691, except the initial order when described in the CBD synopsis.

3.7.2.5. A-Es receive contracts of 1 year with an optional 1-year extension.

3.7.2.6. Yearly fees may not exceed the limitation in AFFARS 5336.691.

3.7.2.7. Select A-Es according to the procedures for award of contracts over \$25,000.

3.7.2.8. State in the synopsis if the Contracting Officer may award multiple contracts from a single synopsis or notice of intent to contract [FAR 5.203(e)].

3.7.2.9. Negotiate, in order of priority, with the firms listed on the final slate for each separate award.

3.7.3. Environmental Compliance, Prevention, And Restoration Projects. IDIQ contracts follow the rules in paragraphs 3.6.2.1, 3.6.2.2, and 3.6.2.7 through 3.6.2.9, and the following:

3.7.3.1. The contract must not exceed 5 years, including the basic and option years. [See AFFARS 5336.691(i)(2)].

3.7.3.2. MAJCOM contracting and engineering offices jointly decide the total individual contract amount, which must not exceed \$200 million. (See AFFARS 5336.691i.)

3.8. Small Business Contracts:

3.8.1. Consult with the small business specialist in the base contracting office. See FAR Part 19 and the DoD FAR and Air Force FAR supplements for small business definitions and procedures.

3.8.2. For acquisitions conducted under the authority of Section 8(a) of the Small Business Act, the Small Business Administration provides a list of at least three Section 8(a) qualified A-E firms to the contracting activity for evaluation. Conduct evaluations according to the FAR and this instruction. After evaluations and selections, the Contracting Officer prepares the contract using Section 8(a) procedures.

Chapter 4

GENERAL INFORMATION AND PLANNING

4.1. General Information:

4.1.1. **Goal and Objective.** The goal of design and construction is to satisfy the user's needs with quality construction. The primary objective of design and construction management is to acquire quality facilities on time and within available resources.

4.1.2. Responsibilities:

4.1.2.1. **Secretary of the Air Force.** Provides guidance for the Air Force construction program through the Deputy Assistant Secretary/Installations (SAF/MII). (Air Force Real Estate Agency: Directs acquisition, management, and disposal of Air Force real property assets.)

4.1.2.2. **The Civil Engineer, Headquarters United States Air Force (HQ USAF/CE.** Develops policy and oversees management of design and construction programs.

4.1.2.3. **Office of the Air Force Reserve (HQ USAF/RE).** Develops policy unique to Reserve construction programs and oversees management of those programs.

4.1.2.4. Major Command Civil Engineers:

- Direct execution of the Military Construction (MILCON) program, Operation and Maintenance (O&M), nonappropriated fund, and P-341 design and construction programs, (see AFI 32-1021, *Planning and Programming of Facility Construction Projects*).
- Serve as Design Managers and Construction Managers providing planning, design, and construction project management for the MILCON program.
- As requiring MAJCOMs represent user interests and provide functional requirements.
- As host MAJCOM Civil Engineer, ensure proper siting, compliance with the Base Comprehensive Plan and Architectural Compatibility program, and preparation of programming documents.

4.1.2.5. **Construction Management Office of Headquarters Air Force Center for Environmental Excellence (HQ AFCEE/CM).** Performs Design Manager and Construction Manager functions for Air Force Reserve MILCON, medical (in the Continental United States [CONUS]) MILCON, smaller CONUS MAJCOMs' MILCON, and for selected projects.

4.1.2.6. **Systems Engineering Directorate, Headquarters Air Force Civil Engineer Support Agency (HQ AFCESA/EN) and Design Group, Headquarters Air Force Center for Environmental Excellence (HQ AFCEE/DG).** Provide design criteria and technical assistance for quality life-cycle management of facilities supporting capital investment strategies.

4.1.3. **Nonappropriated Fund Projects.** Normally, MAJCOMs manage nonappropriated fund projects. *EXCEPTIONS:*

- The Army and Air Force Exchange Service and Defense Commissary Agency manage their own projects according to separately issued guidance.
- The Air Force Morale, Welfare, and Recreation Advisory Board approves centrally funded nonappropriated fund projects before design starts.

Provide design services according to AFI 32-1022, *Planning and Programming of NAF Facility Projects*, **Chapter 5**. Projects should be at the 35 percent design stage for the 1 July annual report to the Congress.

4.2. Planning:

4.2.1. **Base Comprehensive Plan.** Each installation prepares and maintains an up-to-date Base Comprehensive Plan to comply with AFI 32-7062, *Base Comprehensive Planning*. The Plan identifies where existing facilities are and where new facilities should be located.

4.2.2. **Area Development Plan.** For a proposed facility, the Area Development Plan describes:

- Existing site conditions.
- Facilities servicing the site.
- Functions of the surrounding facilities and future development.
- Land uses.
- Transportation routes.

The Area Development Plan supports the Base Comprehensive Plan by addressing and resolving localized comprehensive planning issues.

4.2.3. **Requirements and Management Plan.** The Base Civil Engineer prepares a Requirements and Management Plan (RAMP) for each MILCON project on their installation. User input is critical to satisfactory RAMP preparation.

4.2.4. **Project Management Plan.** The requiring or host MAJCOM, Air Force Design Manager, and Design Agent prepare the Project Management Plan, which is a part of the RAMP. The Project Management Plan documents the Design Manager's and Design Agent's strategic decisions on design and construction methods.

Chapter 5

DESIGN MANAGEMENT

Section 5A—Guidance Applicable to All Included Programs

5.1. Design Standards and Criteria. Designers use **Chapter 1** of this instruction; Military Handbook 1190, *Facility Planning and Design*; AFM 88-43, *Installation Design*; and Engineering Technical Letters (ETL) for guidance in preparing contract documentation. Major Commands (MAJCOM) provide functional criteria. The Base Civil Engineer provides designers with local design guidance covering such areas as architectural compatibility and aesthetics, the Base Comprehensive Plan, and maintainability. See **Chapter 7** of this instruction for medical Military Construction (MILCON) projects.

5.2. Standard Designs. Use standard designs, whether site-adapted or standard modules, that meet operational or functional requirements, when practical.

5.3. Environmental Quality Standards. All designs must meet:

- Applicable Federal, state, interstate, and local environmental standards and regulations in the United States, its trust territories, and possessions.
- Host nation standards and regulations in overseas locations or US Environmental Protection Agency (EPA) standards, whichever are stricter.

5.4. Energy Efficiency. Designers will:

- Consider energy efficiency in all new facilities.
- Apply energy efficiency to revitalization and modification projects to the maximum extent possible.
- Comply with the standards in 42 U.S.C. 6834, *Energy Conservation Standards for Existing Buildings*, when renovating buildings or designing new buildings.
- Evaluate renewable forms of energy in accordance with 10 U.S.C. 2857, *Use of Renewable Forms of Energy in New Facilities*.

5.5. Design Funds. Pay the design cost from the same program (Operation and Maintenance [O&M], MILCON, or nonappropriated funds) that funds the facility construction (3400 or 3600, 3300, or nonappropriated funds). For MILCON (P-321 and P-331 Funds) and minor construction (P-341 Funds) projects, use P-313 (design) funds for design services and not for advanced planning functions. The O&M account funds must be used for advance planning to support MILCON projects.

5.6. Design Reviews. The Design Agent is responsible for technical adequacy on all projects. The user is responsible for functional adequacy.

- 5.6.1. On MILCON projects, the Air Force may perform technical review when special expertise or local conditions justify this requirement.

5.6.2. The MAJCOMs provide technical approval of all O&M and MAJCOM-funded nonappropriated fund projects, but may request technical assistance from HQ AFCESA/EN or Headquarters Air Force Center for Environmental Excellence Design Group (HQ AFCEE/DG).

5.6.3. **Joint Project Review.** If lack of funding or other reasons delay by 120 or more calendar days a completely designed project from going to the contracting stage, the Base Contracting Officer, Base Civil Engineer, and user should jointly review the project again immediately before sending it to the contracting office.

5.6.4. **Floodplains and Wetlands Regulations.** All Air Force construction projects in the US and its territories must conform with Executive Orders 11988, *Floodplains Management*, and 11990, *Protection of Wetlands*.

5.7. Maintaining the Currency of Data in the Information Management System:

5.7.1. **Programming, Design, and Construction.** Programming, Design, and Construction (PDC) is a management information system used by the Air Staff, MAJCOMs, Design Managers, and Construction Managers to provide:

- Management assessments of project cost.
- Dates of major milestones (both estimated and actual milestones are included).
- Information to help concerned organizations manage their projects.
- Data for Management Decisions

5.7.2. Definitions:

5.7.2.1. In design, the current working estimate (shown in PDC as the basic current working estimate) is the estimated cost to construct a complete facility. The current working estimate with additives (shown in the PDC as basic plus adds) is the estimated cost for the complete facility with additional amenities.

5.7.2.2. In construction, the current working estimate provides the costs to complete the project under contract.

5.8. Controlling Costs:

5.8.1. The Congress approves each project at a specific authorized and appropriated amount. Project obligations may not exceed a designated threshold amount without Congressional reapproval.

5.8.2. A cost variation (10 U.S.C. 2853) is a change to the cost authorized for a MILCON project when the current working estimate of a project exceeds the authorization threshold or the scope is reduced by more than 25 percent of the congressionally approved scope. Prior congressional approval is not necessary for:

- Actions below the authorization threshold.
- Cost increases due solely to final settlement of a contractor's claim.
- Projects that the Construction Agent is completing in their entirety with obligated funds in an expired status.

5.8.3. Requiring MAJCOMs aim to minimize cost increases by:

- Involving users during the early stages of programming and design.
- Ensuring that the project definition fully describes all user requirements.
- Conducting effective design reviews and value engineering studies.
- Processing change requests promptly.

5.8.4. Changes must meet the bona fide need rule and are funded from an appropriation depending upon the funding year (the fiscal year in which Congress funded the project) and the type of change. Consult the Program Management Division, Directorate of Military Construction (HQ USAF/CECM) or Deputy Assistant Secretary of the Air Force (Financial Management and Comptroller) for Budget, Investment Directorate, Assistant for Construction (SAF/FMBIC) with questions on the proper use of prior year appropriations ("good year", expired, canceled).

5.9. Change Control:

5.9.1. Scope Changes:

5.9.1.1. MAJCOM Civil Engineers may approve increases in scope to 10 percent; and decreases in scope not exceeding 25 percent.

5.9.1.2. Design Managers and Construction Managers send all requests for Air Force Reserve projects to the Directorate of Programs and Resources (HQ USAF/REX), 1150 Air Force Pentagon, Washington DC 20330-1150, for approval.

5.9.1.3. HQ USAF/CEC/REX may approve increases in scope between 10 and 25 percent.

5.9.1.4. Congress must approve increases or decreases in scope exceeding 25 percent.

5.9.1.5. When the MAJCOM or HQ USAF/CEC/REX approves increases in scope, the cost increase may not exceed the limits of program flexibility without processing a reprogramming request (paragraph [5.9.2.](#)).

5.9.1.6. For minor construction projects, costs may not exceed the \$1.5 million Congressional ceiling.

5.9.2. **Reprogramming.** The Construction Manager or Design Manager submits a reprogramming request when the current working estimate based on opened bids will exceed the appropriation threshold. When the appropriation and the authorization differ, the lesser amount controls. The Design Manager or Construction Manager and the requiring MAJCOM prepare the reprogramming request.

5.10. Resiting. MAJCOMs approve facility siting and resiting per AFI 32-7062, *Base Comprehensive Planning* (formerly AFR 86-4).

5.11. Interior Design. The Design Manager obtains professional design services in accordance with the current ETL on Air Force interior design policy. The requiring MAJCOM identifies projects to receive full Comprehensive Interior Design and approves the interior design package.

5.12. Constructibility Reviews:

5.12.1. **Purpose.** To ensure clarity of plans and specifications so that the design reflects a constructible facility and reduced modifications during construction which lead to higher costs and delayed contract completion.

5.12.2. **Responsibilities.** The Design Agent, including the Base Civil Engineer, performs a constructibility review.

5.12.3. **Checklist.** The current Construction Technical Letter (CTL) 88-7 on constructibility review lists items that a Design Manager or a Design Agent needs to check during a constructibility review.

5.13. Maintainability Reviews. The Base Civil Engineer Operations and Engineer flights jointly oversee maintainability and reliability issues. They may use ETL 88-4, *Reliability and Maintainability (R&M) Design Checklist*, during this review. The Base Civil Engineer annotates the project file with the date of the review, all comments and recommendations made, and the results.

5.14. Value Engineering:

5.14.1. **Policy.** The Air Force supports a strong value engineering program to provide cost-effective facilities. The goal of value engineering for all Air Force projects is to reduce the cost of facility ownership without reducing quality:

5.14.1.1. The requiring MAJCOM identifies projects for value engineering study and either conducts the study in-house or provides planning and design funds to the Design Agent. The MAJCOM will:

- Apply value engineering principles to projects.
- Ensure the Design Agent conducts a value engineering study on each project with a program amount over \$10 million.
- Evaluate each project with a program amount between \$1 million and \$10 million and authorize the Design Agent to conduct a value engineering study if they expect a return on investment (savings to study cost) of 10 to 1 or greater.

5.14.1.2. Construction contractors submit value engineering change proposals; they are evaluated and approved by the Construction Manager. Value engineering change proposals are implemented by contract modifications and reported through the PDC. Net savings are shared between the contractor (55 percent) and the government (45 percent) as stated in Part 48, *Value Engineering*, of the Federal Acquisition Regulation (FAR).

5.14.2. Responsibilities:

5.14.2.1. Major Commands:

- Request value engineering studies for projects and authorize funding.
- Document reasons for not conducting a value engineering study (for a program amount over \$10 million, the MAJCOM Civil Engineer must approve).
- Approve value engineering study recommendations and value engineering change proposals and document the reasons (with the decision maker's name) for disapprovals.
- Publish criteria for performing value engineering studies on their O&M and nonappropriated fund programs.

- Report and update value engineering data through the PDC.
- Prepare and submit annual value engineering plans and value engineering summary reports according to the annual call letter.

5.14.2.2. **Design Managers:**

- Work with the MAJCOM and Design Agent to implement the value engineering program.
- Issue value engineering instructions to the Design Agent.
- Select additional projects for value engineering study when it appears the Air Force may realize savings.
- Must input the value engineering study decision and study results on PDC value engineering screen.

5.14.2.3. Base Civil Engineer reviews all value engineering studies:

5.15. Host-Tenant Responsibilities. MAJCOM personnel manage the host-tenant aspects of design and construction management for:

- Intra-Air Force situations per AFI 25-201, *Support Agreements Requirements*. For O&M projects, the host MAJCOM and base manage and fund project design. By agreement of host and tenant, the tenant organization may fund design and construction. (See AFI 32-1032, *Planning and Programming of Real Property Maintenance Requirements*.)
- Situations involving other DoD components or Federal agencies per AFI 65-601, Volume 1, *US Air Force Budget Policies and Procedures* (formerly AFR 172-1, Volume 1 and AFR 172-8) agreements.

5.16. **Expiration and Expedition:**

5.16.1. **Expedited Construction Project.** Title 10 U.S.C. 2858 authorizes use of MILCON funds to absorb extra cost of an expedited project when the Air Force critical need date is earlier than the normal completion date only if the SAF certifies the extra cost is necessary to protect the national interest, and the completion date is reasonable.

5.16.2. **Expiration of Congressional Authorizations.** Authorizations for Air Force MILCON projects expire on 1 October of the third year after the year of the original authorization, or on the date the President signs the new Military Construction Authorization bill, whichever date is later.

5.16.2.1. Partial awards (intended to keep an authorization from expiring):

- Must involve a "construction placement" rather than the purchase of Government furnished material or equipment.
- Apply to projects with at least 95 percent of the design complete and HQ USAF/CEC approval for award.

5.16.2.2. Authorizations for Air Force Reserve projects expire after 5 years.

5.16.3. **Expiration of Congressional Appropriations (Title 10 U.S.C. 2860).** Funds appropriated for a fiscal year for a MILCON project may remain available beyond the fiscal year for as long as the

authorization specifies (in most cases, at the end of the fifth year). For example, FY 94 funds expire 30 September 1998.

5.17. Architect-Engineer Responsibilities. The A-E contractor responsibilities will be in accordance with FAR 36.608, *Liability for Government Costs Resulting from Design Errors or Deficiencies*, and FAR 36.609, *Contract Clauses*.

Section 5B—Design Initiation

5.18. HQ USAF/CEC or HQ USAF/REX:

- Reports on the overall execution of design and construction.
- Issues planning instructions through the PDC for projects.
- Notifies the Congress, according to 10 U.S.C. 2807, *Architectural & Engineering Services and Construction Design*, when the project design fee will exceed that cost threshold.
- If a project requires other than the normal Design Agent, obtains approval according to 10 U.S.C. 2851, *Supervision of Military Construction Projects*, and DoD Instruction 4270.5, *Military Construction Responsibilities*.

5.19. Design Manager:

- Serves as the primary Air Force point of contact for the Design Agent.
- Works with the Design Agent and the requiring MAJCOM to determine acquisition strategy.
- Prepares the Project Management Plan.
- Reviews RAMPs to ensure their ability to guide design and forwards the RAMP and other criteria to the Design Agent.
- Issues field Design Instructions to the Design Agent.
- Monitors 10 U.S.C. 2807 actions through the PDC and ensures that the Design Agent issues the Commerce Business Daily (CBD) notice when the 10 U.S.C. 2807 action is complete.
- Reviews and coordinates the design schedule, design budget estimate, and construction period that the Design Agent proposes to ensure that the proposal meets Air Force needs.
- Design Managers base requests for P-313 MILCON design funds on the project design budgets that the Design Agent prepares.
- Works with the MAJCOM to determine the need for environmental permits.
- May serve as a member on A-E selection boards.
- Provides AF Form 1178, **FY Project Cost Estimate Summary**, based on the parametric cost estimate, for the requiring MAJCOM to review and send to HQ USAF/CEC or HQ USAF/REX to meet the annual call for program pricing.

5.20. Host Major Command:

- Tasks the Base Civil Engineer to prepare a Requirements and Management Plan (RAMP).

- Reviews RAMPs to ensure compliance with applicable guidance.
- Ensures that the RAMP fully represents user and host-base requirements. Submits the RAMP to the Design Agent within 30 days of the planning instruction.
- May participate in the A-E selection.
- Verifies siting.
- Ensures that personnel complete the environmental impact analysis.

5.21. Requiring Major Command:

- Identifies facility requirements and Air Force critical need dates to the host MAJCOM.
- Identifies and validates special requirements such as shielding, prewiring for communications-computer systems, Comprehensive Interior Design, or mechanical and electrical systems.
- Ensures that users help to identify facility requirements and develop the RAMP.
- Notifies the host MAJCOM when sending the DD Form 1391 to HQ USAF/CEC or HQ USAF/REX in the initial requiring MAJCOM submittal.
- In developing projects, complies with the host MAJCOM and host base programs such as architectural compatibility, maintainability, anti terrorism, and air base survivability.
- When the Design Manager issues the planning instruction, authorizes the use of design funds from project definition through design completion.
- May participate in A-E selection.
- Participates in all design conferences.

5.22. Base Civil Engineer:

- Prepares the RAMP when the MAJCOM requests by using the current technical letter on developing the RAMP. Ensures user participation in preparing the RAMP. Incorporates the base's portion of the Project Management Plan in the RAMP. Sends the completed RAMP to the host MAJCOM and the requiring MAJCOM.
- Provides as-built facility, utility, and site information and environmental and hazardous data at the preproject definition conference.
- Ensures that the appropriate user and base agencies reviewing the project attend the pre-project definition conference.
- Participates in A-E selection when the host MAJCOM requests.

Section 5C—MILCON Design and Contract Award Management

5.23. HQ USAF/CEC or HQ USAF/REX:

- Distributes design and construction authorizations.
- Authorizes advertising when the design current working estimate exceeds the program amount (or if management controls affect the project) and enters the decision into the PDC.

- When SAF approval is required (for projects overseas, in the national capital region, or at closing bases), authorizes advertising only if:
 - The design completion percentage reported in the PDC is 95 percent or greater.
 - The current working estimate is less than the Air Force Flex.
 - HQ USAF/CE has released the SAF approval request package.
- Authorizes construction contract award when the lowest responsive responsible bid or the most advantageous proposal exceeds the program amount.

5.24. Design Manager:

- Conducts reviews to ensure that projects meet Air Force policy, commitments to Congress, proper scope, criteria and regulations.
- Consolidates comments from all Air Force agencies and provides them to the Design Agent.
- Ensures that the designer incorporates Air Force comments or explains to the reviewer (for example, MAJCOM, base, HQ AFCEA/EN) why the designer didn't incorporate them.
- Maintains project data in the PDC.
- Evaluates the project definition and 95-percent design cost estimates to determine if the program amount is adequate.
- Ensures the Design Agent conducts a constructibility review.
- Ensures all required environmental permits and certifications are acquired and ensures the environmental impact analysis is complete or that the project qualifies for a categorical exclusion before authorizing construction contract advertising.
- Authorizes advertising when the design current working estimate is less than the program amount and SAF management controls do not affect the project.
- Authorizes construction contract award when the lowest responsive responsible bid or the most advantageous proposal is less than the program amount.

5.25. Host Major Command:

- Reviews the design for maintainability and Base Comprehensive Plan conformance.
- Recommends action on design review comments from the base.
- Validates and approves user-proposed changes after the project definition design approval only when the change is necessary to meet the mission. Sends the approved changes to the Design Manager, and insures all comments are included.

5.26. Requiring Major Command:

- Ensures that the designer incorporates user needs in the design within the approved scope and budget.
- Validates and approves user changes after the project definition design approval only when the change is necessary to meet the mission. Sends approved changes to Design Manager.

- Checks to ensure that the designer has included all comments.
- Works with the host MAJCOM and Design Manager to control the current working estimate and scope within the approved amount and scope. If necessary, identifies and coordinates additives with the host MAJCOM and Design Manager.
- Advises the Design Manager of changes to the Air Force critical need date as changes occur. Justifies expected costs to the Design Manager for determining contract provisions for liquidated damages. Identifies to the Design Manager restrictions to impose on the construction contractor. Coordinates these actions with the host MAJCOM.

5.27. Base Civil Engineer:

- Provides functional, maintainability, and constructibility inputs to the MAJCOM including requirements from all base activities.
- Ensures appropriate base personnel participate in project reviews to verify that the project satisfies the mission requirements, is compatible with the Base Comprehensive Plan, and meets environmental engineering and maintenance requirements.
- Obtains design review comments from the user and all pertinent base-level organizational personnel such as the fire chief, base communications-computers systems officer, security police, security systems OPRs, bioenvironmental engineer, and antiterrorism representative and sends them to the MAJCOM. Upon receiving the next submittal, checks to ensure that the designer has included all comments.
- Gets base agency representatives to sign the final design and sends it to the MAJCOM and the Design Manager.

Section 5D—341) Program

5.28. HQ USAF/CEC or HQ USAF/REX:

- Obtains Office of The Civil Engineer (HQ USAF/CE) or Deputy Assistant Secretary/Installations (SAF/MII) project approval.
- Issues the planning instruction for the project to the MAJCOM through the PDC system.
- Funds P-313 design fund requests.
- Sends the P-341 construction program authorization to the MAJCOM.
- Authorizes construction advertising through the PDC system.
- Evaluates cost variations and submits them to HQ USAF/CE or SAF/MII for reapproval.
- Approves transfer of P-341 funds between projects.

SAF/MII notifies the Congress of the project approval. (See AFI 32-1021, *Planning and Programming of Facility Construction Projects*, [Chapter 4](#).) The congressional notification requires a 30-calendar-day waiting period before construction funds can be obligated.

5.29. Design Manager:

5.29.1. The Design Manager manages the projects according to the Design Manager responsibilities in paragraph 5.19. and paragraph 5.24. for MILCON projects, except a RAMP is not required when using in-house Base Civil Engineer resources for design.

5.29.2. HQ USAF/CEC/REX doesn't require an AF Form 1178 based on the project definition design phase for the annual program pricing exercise. The Design Manager sends the project definition and 95 percent design cost estimates, bid opening and contract award reports, and funds requests due to construction changes to HQ USAF/CEC/REX through the PDC.

5.29.3. P-341 funds support A-E construction supervision and inspection services and any required A-E design services (engineering and design or post contract award services) after the Design Agent awards a construction contract.

5.30. Host Major Command. Host MAJCOMs perform the host MAJCOM responsibilities in paragraph 5.20. and paragraph 5.25. for MILCON projects, except:

- Request funds, when required for Base Civil Engineer implementation of A-E design contracts, from HQ USAF/CEC/REX.
- Validate and approve user comments and proposed changes.

5.31. Requiring Major Command. Requiring MAJCOMs perform the requiring MAJCOM responsibilities in paragraph 5.21. and paragraph 5.26. for MILCON projects.

5.32. Base Civil Engineer:

- Performs Base Civil Engineer responsibilities in 5.22. and 5.27. for MILCON projects.
- When serving as the Design Agent or Construction Agent, follows the host MAJCOM instructions.

Chapter 6

CONSTRUCTION MANAGEMENT AND PROJECT ACCEPTANCE

Section 6A—Construction Management Procedures

6.1. Construction Funding. Headquarters US Air Force [Office of the Reserve, Programs and Resources Directorate (HQ USAF/REX) for Air Force Reserve projects; Office of The Civil Engineer, Directorate of Military Construction (HQ USAF/CEC) otherwise] authorizes issuing construction funds to the Construction Agents. Funds are designated P-321 for projects in the CONUS, Alaska, Hawaii; and P-331 for overseas projects. The Construction Agent uses P-321 or P-331 funds for:

- The construction contract.
- The Construction Agent's fee (Supervision, Inspection, and Overhead) for administering contracts and overseeing construction activity.
- Architect-Engineer (A-E) construction supervision and inspection services (Title II as described in [Chapter 3](#)).
- Required A-E design after awarding construction (engineering and design or post-contract award services).

6.2. Construction Changes. Once construction is underway the following types of changes are approved and funded as follows:

- **Construction Agent Changes.** Approved by the Construction Agent and funded with project contingency funds.
- **Construction Agent Change Request.** Submitted by the Construction Agent, approved by the Construction Manager and funded with project contingency funds.
- **Air Force Change Request.** Approved by the requiring MAJCOM and funded using project management reserve funds.

6.3. Construction Management Plans. During project design, the Design Manager develops a Construction Management Plan for large or complicated projects and for those which will have a resident Construction Manager. This plan is coordinated with the MAJCOM, HQ USAF/CEC or HQ USAF/REX, and the Construction Agent. In developing the Construction Management Plan, the Design Manager evaluates and justifies the need for a resident Construction Manager (for HQ USAF/CEC or REX approval) and assigns resident Construction Manager responsibilities.

Section 6B—Construction Management Responsibilities

6.4. HQ USAF/CEC/REX:

- Processes construction funds requests from the Construction Manager.
- Works with the requiring MAJCOM to identify and verify sources of funds.
- Approves construction contract awards and changes when not within funding limits.

- Submits reports, cost variations, reprogrammings, scope changes, and other congressional notifications to the Congress through the Secretary of the Air Force (SAF) based on justifications from the requiring MAJCOM.

6.5. Construction Manager:

- Reports progress and manages the construction change request process.
- Ensures that all construction changes are within the scope of work, and don't violate any Federal Acquisition Regulation (FAR) provisions. Tracks and reports cost growth.
- Coordinates all user changes for medical projects with the appropriate Regional Health Facilities Office of the Health Facilities Division (HQ AFMSA).
- Directs the Construction Agent to implement MAJCOM-approved user changes.
- Makes a request (based on the Construction Agent's cost estimate) to the requiring MAJCOM through Programming, Design, and Construction (PDC) when the Construction Agent requires additional funds above the established current working estimate. When a change request results in a current working estimate over the current construction funding, the need for additional funding is indicated to HQ USAF/CECM or REXP through PDC.
- Ensures construction meets Air Force standards and user needs.
- Works with the Construction Agent to correct design errors and omissions.
- Coordinates inspection schedules proposed by the Construction Agent with the host and requiring MAJCOMs and the Base Civil Engineer.
- Sends completed AF Form 1178A, **Project Cost Estimate Worksheet - Building Description**, and 1178B, **Project Cost Estimate Worksheet - Detail Cost**, to Construction Cost Management Directorate, Headquarters Air Force Civil Engineering Support Agency (HQ AFCESA/DC), 139 Barnes Drive, Tyndall AFB FL 32403-5319 upon award of the contract and upon completion of the contract.
- Ensures the Construction Agent delivers warranty and guarantee information to the Base Civil Engineer in transferring responsibility. (See Construction Technical Letter [CTL] 89-3, *Warranty and Guarantee Program*.)
- Ensures the contractor delivers mylar or equal as-built drawings and computer-aided drafting and design (CADD) disks to the Base Civil Engineer within 30 calendar days of the contractual completion date. Ensures the contractor delivers technical data and systems operations manuals to the Base Civil Engineer when they are required for complex facilities.
- Monitors financial completion of a project to enable withdrawal of unused funds in a timely manner.
- The comptroller may hold funds for facilities that are physically complete but not financially closed out because of a pending claim if the comptroller receives a written statement from the Contracting Officer that a settlement and obligation of the funds is scheduled within 120 calendar days.
- Ensures the comptroller doesn't keep funds for paying pending claims (involving an appeals board) at field level after facility acceptance.

- Submits the request and justification for additional funds to HQ USAF/CEC or HQ USAF/REX If an appeals board reviews a contract claim and directs the Contracting Officer to settle the claims and reach an agreement on the adjusted claim amount.
- Recommends post-occupancy inspections to the host MAJCOM. Ensures personnel conduct post-occupancy inspections (see paragraph 6.15.) when the host MAJCOM authorizes. Prepares "lessons learned" reports for distribution to the Air Force Civil Engineer community via the E-mail System.

6.6. Host Major Command:

- Evaluates construction progress.
- Reviews all changes that impact maintainability. If the host MAJCOM is not the requiring MAJCOM, the host MAJCOM submits changes to the requiring MAJCOM for approval.
- Works with the requiring MAJCOM and the Base Civil Engineer to ensure timely delivery of Government furnished property/equipment.
- Makes site visits as appropriate.
- Participates in prefinal and final inspections.
- Evaluates the need for post-occupancy inspections and authorizes the Construction Manager to conduct the inspection.

6.7. Requiring Major Command:

- Requests the base user to participate in critical inspections, especially the prefinal and final inspections, to help the Base Civil Engineer identify deficiencies to the Construction Manager.
- Approves user change requests, within funds available, up to the congressional reprogramming threshold. Reviews change requests promptly and restricts approval consideration to those requests necessary to meet the mission. Submits approved user change requests to the Construction Manager.
- For a change request that results in a current working estimate exceeding the current construction funding, provides the Construction Manager a justification explaining why the MAJCOM didn't expect and plan for the requirement when Congress originally approved the project.
- Submits justification packages for cost and scope variations and reprogrammings to HQ USAF/CEC or HQ USAF/REX.
- Attends final and post-occupancy inspection as required.
- Works with HQ USAF/CEC to identify funds sources for projects when needed.
- Reviews and approves submittals for all interior finishes including systems furniture.

6.8. Base Civil Engineer:

- Participates in the prebid and site visits and the preconstruction conference.
- Establishes work orders (AF Form 327, **Base Civil Engineer Work Order**) for Military Construction (MILCON) projects, for which the Air Force is Design Agent and Construction Agent in

accordance with AFI 32-1031, *Operations Management* (formerly AFR 85-2) and AFI 32-9005, *Establishing, Accounting, and Reporting Real Property* (formerly AFR 87-5).

- Reviews and approves material submittals for exterior finishes. Reviews equipment submittals for maintainability and compatibility with other base systems. Sends recommendations to the Construction Manager and MAJCOM.
- Ensures base agencies facilitate timely start of construction.
- Conducts and documents construction surveillance according to MAJCOM instructions (may use AF Form 1477, **Construction Inspection Record**).
- Checks the quality of construction. Notes features that will cause future maintenance problems, and requests correction through the Construction Manager. Ensures that communications-computer, fire protection, and security systems meet requirements before the Beneficial Occupancy Date. Advises the host MAJCOM and requiring MAJCOM of design and construction deficiencies or unfavorable conditions. Tracks deficiencies to ensure the contractor corrects them. Promptly elevates unresolved issues to the host MAJCOM, requiring MAJCOMs when applicable, and Construction Manager for resolution.
- While monitoring construction, reports any potential hazards and dangerous conditions to the Construction Agent and notifies the Construction Manager and MAJCOMs of schedule slippages or phasing deviations that impact the need date.
- Invites the user to accompany Base Civil Engineer personnel on site visits to ensure that construction meets user needs.
- Serves as the Construction Agent's point of contact for Government furnished property/equipment.
- Promptly sends base-level change requests to the appropriate MAJCOMs for approval, and monitors status.
- Participates in the prefinal and final inspections and receives from the Construction Agent system operations manuals, training on equipment, warranty and guarantee information, CADD disks and mylar, or equal as-built drawings.
- Conducts surveillance of the construction of all nonappropriated fund projects.
- The Base Civil Engineer and the Health Facilities Division, Office of the Surgeon General, jointly accept medical facilities.

Section 6C—Acceptance Procedures

6.9. Applicable Programs. This section outlines the procedures and responsibilities for transferring and accepting constructed facilities.

6.10. Types of MILCON Acceptance Inspections. MILCON projects require preliminary, prefinal, and final inspections. The Construction Manager must ensure the participants receive a timely invitation for any of these inspections.

6.10.1. **Preliminary Inspection.** The Construction Agent and Air Force personnel identify deficiencies, establish standards of quality for acceptance and mutually agree on a Beneficial Occupancy Date. The construction contractor does not attend.

6.10.2. **Prefinal Inspection.** The Construction Agent and the contractor conduct a detailed and thorough inspection to identify construction deficiencies and remaining contractual items (such as systems operating manuals, spare parts lists, as-built drawings, and training requirements). During the inspection they document deficiencies on a "punchlist."

6.10.3. **Final Inspection.** The Construction Agent conducts this inspection with the Construction Manager, the Base Civil Engineer, the user, the base communications-computer systems officer, and the construction contractor. The Base Civil Engineer or the designated representative accepts the facility for the Air Force on DD Form 1354, **Transfer and Acceptance of Military Real Property**, if satisfied the facility meets requirements and the plan to fix deficiencies is reasonable.

6.11. Acceptance Procedures for Non-MILCON Projects. MAJCOMs must supplement this instruction to establish procedures for accepting these projects.

6.12. Joint Occupancy:

6.12.1. **Approval.** The Construction Manager may approve joint occupancy when it is advantageous to the Government.

6.12.2. **Joint Occupancy Date.** The Construction Manager (working with the host or requiring MAJCOM) and the construction agent jointly determine the joint occupancy date.

6.12.3. **Facility Maintenance Responsibility.** When agreeing to joint occupancy, the Air Force assumes responsibility for maintenance and repair of items not under warranty and for operations of portions of the facility occupied during joint occupancy.

6.12.4. **Contractor Occupancy After Joint Occupancy.** When the Air Force agrees to let a contractor continue to occupy or use a facility after it has accepted the facility, for any purpose other than to finish correcting deficiencies, the Air Force treats the contractor as a tenant and receives payment (according to AFI 65-601, Volume 1, *US Air Force Budget Policies and Procedures* [formerly AFR 172-1, Volume 1 and AFR 172-8]) for any logistical support the Air Force provides to the contractor.

Section 6D—Construction Quality

6.13. Responsibilities. Everyone is responsible for quality.

6.14. Quality Assurance. Government personnel (from the Construction Agent for MILCON and from the Base Civil Engineer otherwise) perform quality assurance and serve as the Contracting Officer's representative.

6.14.1. Construction quality assurance inspector:

- Ensures the quality control system functions properly and produces the specified end product.
- Coordinates the contractor's activities with base agencies.
- Observes the contractor's activities and reports deviations and hazardous practices to the Contracting Officer.

- Recommends final acceptance.
- Uses the knowledge, expertise, and experience of both the project design architects or engineers and those maintaining base facilities to ensure the contractor provides the quality construction that the contract documents specify.

6.15. Post-Occupancy Inspections:

6.15.1. **Requirement.** A post-occupancy evaluation team conducts post-occupancy inspections 9 to 11 months after the contractor completes construction. The purpose of a post-occupancy evaluation team inspection is to identify design or functional deficiencies and "lessons learned."

6.15.2. **Responsibilities.** The MAJCOM authorizes post-occupancy inspections and the Construction Manager invites participants from all interested agencies (including the Construction Agent) who can benefit from the future incorporation of noteworthy factors resulting from this inspection. The Construction Manager summarizes "lessons learned" and distributes them to the Air Staff Civil Engineer, Field Operating Agency Directors, concerned MAJCOMs, and all Base Civil Engineers. The Construction Manager sends items of interest concerning Military Handbook 1190 or criteria to HQ USAF/CEC and to HQ AFCESA/EN. Base Civil Engineer personnel check 1-year warranty items even when a post-occupancy evaluation team inspection doesn't take place.

Chapter 7

MEDICAL FACILITIES DESIGN AND CONSTRUCTION PROCEDURES

7.1. Scope. This chapter applies to the design and construction of all Air Force medical and medical related facilities (Category Codes 500; 442 - medical storage and War Readiness Material facilities; 310 - medical related laboratory, research, development, and test facilities; and 171 - medical training facilities). Planning and programming procedures for medical facility projects are covered in AFI 32-1021, *Planning and Programming of Facility Construction Projects*.

7.2. Applicable Directives:

- DoD Directive 6015.16, *Department of Defense Policies for the Acquisition of Military Health Facilities*, April 15, 1986.
- DoD Instruction 6015.17, *Procedures for the Planning, Programming, Budgeting and Execution for Construction of Military Health Facilities*, March 17, 1983.
- Military Handbook 1191 (MIL HDBK 1191), *Department of Defense Medical and Dental Treatment Facilities Design and Construction Criteria*.

7.3. Roles and Responsibilities:

7.3.1. Office of the Assistant Secretary of Defense (Health Affairs) (OASD[HA]). Provides program management for the DoD medical Military Construction (MILCON) program, and funds the medical MILCON program through the Defense Health Program.

7.3.2. Office of the Surgeon General, Headquarters United States Air Force (HQ USAF/SG). Is the using agency for all Air Force medical facilities.

7.3.3. Air Force Medical Operations Agency, Health Facilities Division (HQ AFMSA/SGSF). Represents HQ USAF/SG on all Air Force medical MILCON design and construction issues. Provides space, functional, and operational requirements for medical facility projects. Reviews and approves medical/functional aspects of designs; monitors medical/functional aspects of construction projects. Operates three regional offices that provide direct support to the Major Command (MAJ-COM) Surgeon General and Civil Engineer, the Base Medical Group, and the Base Civil Engineer, for all aspects of medical facility acquisition, design and construction.

7.3.4. Design Manager/Construction Management:

- Construction Management Medical Office, Headquarters Air Force Center for Environmental Excellence (HQ AFCEE/CMM) provides centralized design and construction management expertise for the CONUS, Azores, and Panama medical facilities projects.
- Civil Engineer Construction Division, Headquarters Pacific Air Force (HQ PACAF/CEC) provides centralized design and construction management expertise for the Pacific Area
- Directorate of Military Construction, Headquarters US Air Force (HQ USAFE/CEC) provides centralized design and construction management expertise for Europe

7.3.5. Design Agent and Construction Agent. The headquarters level Medical Facilities Office of the appropriate Design Agent and Construction Agent provides project management and technical

oversight for medical MILCON projects. Other Design Agent and Construction Agent roles and responsibilities are similar to regular Air Force MILCON projects.

7.4. Policy and Criteria. Military Handbook 1191 is the primary source for policy and criteria for medical MILCON projects. It provides general guidance, submittal requirements, design criteria, and construction management procedures. Military Handbook 1191 is supplemented by Military Handbook 1190, *Facility Planning and Design Guide*, this instruction, and Engineering Technical Letters (ETL).

7.5. Functional Requirements. HQ AFMSA/SGSF and OASD(HA) jointly develop a Program for Design, indicating room-by-room space requirements, and a Medical Facility Room Contents Listing, indicating room-by-room equipment requirements. With input from the Base Medical Group and the MAJCOM Surgeon General, OASD(HA) provides final approval of the Program for Design. HQ AFMSA/SGSF develops a Design Narrative, describing functional and departmental relationships, with input from the Base Medical Group.

7.6. Project Authorizations. OASD(HA) issues all design and construction authorizations, including Architect-Engineer selection, design initiation, and contract advertising and award.

7.7. Design Approvals. OASD(HA) reviews and approves concept designs, and approves significant changes in project scope due to changes in concepts of operation and addition or deletion of medical functions.

7.8. Construction Changes. OASD(HA) must approve construction changes over \$100,000 or that exceed available contingency funds, and changes that add new medical services to a project, or exceed approved scope or cost. Construction changes less than \$100,000 are approved by the Design Manager or Construction Manager.

7.9. Base Realignment and Closure Program. Medical projects in the Base Realignment and Closure Program (BRAC) program receive funding from the Air Force BRAC MILCON program. However, design and construction submittal procedures generally follow the medical MILCON procedures. The Design Manager or Construction Manager acquires the required funding and issues all design and construction authorizations to the design agent or construction agent.

7.10. Medical Unspecified Minor Construction Requirements. Process Medical Unspecified Minor Construction (P-341) design and construction projects like medical MILCON projects, with OASD(HA) providing all design and construction authorizations.

JAMES E. McCARTHY, Maj General, USAF
The Civil Engineer

Attachment 1**GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS*****References*****A1.1. Legislation:**

10 U.S.C. 2803, *Emergency Construction*.

10 U.S.C. 2807, *Architectural & Engineering Services and Construction Design*.

10 U.S.C. 2851, *Supervision of Military Construction Projects*.

10 U.S.C. 2853, *Authorized Cost Variations*.

10 U.S.C. 2854, *Restoration or Replacement of Damaged or Destroyed Facilities*.

10 U.S.C. 2855, *Law Applicable to Contracts for Architectural & Engineering Services & Construction Design*.

10 U.S.C. 2857, *Use of Renewable Forms of Energy in New Facilities*.

10 U.S.C. 2858, *Limitation on the Use of Funds for Expediting a Construction Project*.

10 U.S.C. 2860, *Expiration of Congressional Appropriation*.

10 U.S.C. 9540, *Architectural & Engineering Services*.

40 U.S.C. 541-544, *Selection of Architects and Engineers (Brooks Act)*.

42 U.S.C. 6834, *Energy Conservation Standards for Existing Buildings*.

36 CFR 800, *Protection of Historic & Cultural Properties*.

EPA 40 CFR 763G, *Asbestos Abatement Projects*.

Section 8 (a) of the Small Business Act.

A1.2. Federal Government:

Executive Order 11988, *Floodplain Management*, May 24, 1977.

Executive Order 11990, *Protection of Wetlands*, May 24, 1977.

FAR 5.203, *Time of Synopsizing*.

FAR 16.504, *Indefinite-Quantity Contracts*.

FAR Part 19, *Small Business and Small Disadvantaged Business Concerns*.

FAR 36.102, *Definitions*.

FAR Subpart 36.6, *Architect-Engineer Services*.

FAR 36.602-1, *Selection Criteria*.

FAR 36.602-5, *Short Selection Processes for Contracts not to Exceed the Small Purchase Limitation*.

FAR 36.608, *Liability for Government Costs Resulting from Design Errors or Deficiencies*.

FAR 36.609, *Contract Clauses*.

FAR Part 48, *Value Engineering*.

29 CFR Parts 1900-1999, *Occupational Health and Safety Act of 1970*.

A1.3. Department of Defense:

DFARS Subpart 236.6, *Architect-Engineering Services*.

DFARS 236.602-1, *Selection Criteria*.

DoD Directive 4710.1, *Archaeological and Historical Resources Management*, June 21, 1984.

DoD Directive 6015.16, *Department of Defense Policies for the Acquisition of Military Health Facilities*, April 15, 1986.

DoD Instruction 4270.5, *Military Construction Responsibilities*, March 2, 1982.

DoD Instruction 6015.17, *Procedures for the Planning, Programming, Budgeting and Execution for Construction of Military Health Facilities*, March 17, 1983.

MIL HDBK 1008, *Fire Protection for Facilities Engineering, Design, and Construction*, January 15, 1994.

MIL HDBK 1190, *Facility Planning and Design Guide*, September 1, 1987.

MIL HDBK 1191, *Department of Defense Medical and Dental Treatment Facilities Design and Construction Criteria*, October 15, 1991.

A1.4. Air Force:

AFFARS 5336.602.5, *Short Selection Processes for Contracts Not to Exceed the Small Purchase Limitation*.

AFFARS 5336.691, *Use of the Indefinite Delivery, Indefinite Quantity (IDIQ) Contract-Type for the Acquisition of Architect-Engineering (A-E) Services*.

AFPD 32-10, *Installations and Facilities*.

AFI 25-201, *Support Agreements Requirements*.

AFI 32-1021, *Planning and Programming of Facility Construction Projects*.

AFI 32-1022, *Planning and Programming of NAF Facility Construction Projects*.

AFI 32-1031, *Operations Management*.

AFI 32-1032, *Planning and Programming of Real Property Maintenance Requirements*.

AFI 32-1052, *Facility Asbestos Management*.

AFI 32-6002, *Family Housing Programming, Design, and Construction*.

AFI 32-7062, *Base Comprehensive Planning*.

AFI 32-7065, *Cultural Resources Management*.

AFI 32-9005, *Establishing, Accounting and Reporting Real Property*.

AFI 65-501, *Economic Analysis and Program Evaluation for Resource Management*.

AFI 65-601V1, *US Air Force Budget Policies and Procedures*.

AFI 91-301, *The US Air Force Occupational Safety, Fire Prevention, and Health Program.*

AFI 91-302, *Air Force Occupational Safety and Health Standards*

ANG(AF) 86-2, *National Guard Planning Factors.*

ANG(AF) 88-1, *Criteria and Standards for Air National Guard Construction.*

AFM 88-43, *Installation Design*, March 1981.

AFP 178-8, *Economic Analysis Procedures Handbook*, May 1981.

AFH 32-1084, *Standard Facilities Requirements Handbook.*

ETL 88-4, *Reliability & Maintainability (R&M) Design Checklist*, 24 June 1988.

CTL 88-7, *Constructibility Review Checklist*, 1 November 1988.

CTL 89-2, *MAJCOM Construction Management*, 30 May 1989.

CTL 89-3, *Warranty and Guarantee Program*, 22 September 1989.

Abbreviations and Acronyms

A-E—Architect-Engineer

AFFARS—Air Force Federal Acquisition Regulation Supplement

AFOSH—Air Force Occupational Safety and Health

BRAC—Base Realignment and Closure

CADD—Computer Aided Drafting & Design

CBD—Commerce Business Daily

CFR—Code of Federal Regulations

CPFF—Cost Plus Fixed Fee

CONUS—Continental United States

CTL—Construction Technical Letter

DFARS—Defense FAR Supplement

EPA—Environmental Protection Agency

ETL—Engineering Technical Letter

FAR—Federal Acquisition Regulation

FOA—Field Operating Agency

IDIQ—Indefinite Delivery-Indefinite Quantity

MAJCOM—Major Command

MILCON—Military Construction

NAF—Nonappropriated Funds

OASD (HA)—Office of the Assistant Secretary of Defense (Health Affairs)

O&M—Operations and Maintenance

OPR—Office of Primary Responsibility

OSHA—Occupational Safety and Health Administration

P-313 Funds—MILCON Projects Design

P-321 & P-331 Funds—MILCON Projects

P-341 Funds—Minor Construction Projects

PDC—Programming, Design and Construction

R&M—Reliability and Maintainability

RAMP—Requirements and Management Plan

SAF—Secretary of the Air Force

TECHDATA—Technical Data

Terms

Budget Authorization Account Number (BAAN)—Assigned by HQ USAF for budgetary, accounting and control purposes, to identify military construction projects at a specified Air Force base or for a special program; for example, 843 FAC where 84 specifies the authorization year, 3 the funding year, FA the base, and C the specific project.

Comprehensive Interior Design (CID) Services—Includes structure-related finishes and items which are a standard design requirement, as well as selection of furnishings and preparation of furniture placement plans, furnishings specifications, and estimates.

Construction Agent (CA)—The Department of Defense component responsible for the technical execution of project construction. For Air Force Military Construction Projects, this is normally the Army Corps of Engineers or Naval Facilities Engineering Command. Normally, the Base Civil Engineer is the construction agent for base-level construction contracts procured through an Air Force contracting office.

Construction Manager (CM)—The Air Force organization designated to manage construction, provide Air Force interface with the Construction Agent, and provide updates on construction milestones to the Air Staff and major commands for specific projects.

Contracting Officer—A designated government official authorized to enter into, administer, and terminate contracts and make related determinations and findings.

Cost Growth—The difference between the current construction contract amount and the construction contract award amount. The estimated cost of outstanding claims will be included in the current contract amount. Contract modifications which may be excluded are:

- Modifications issued under a "variations in estimated quantities" clause in the contract, or
- Planned modifications when a contract is awarded, providing they are within the scope of the project and could not have been included in the original contract because criteria was not available, or other similar circumstances.

Design Agent—The Department of Defense component responsible for technical execution of project

design. For Air Force Military Construction Projects, this is normally the Army Corps of Engineers or Naval Facilities Engineering Command. Normally, the Base Civil Engineer is the design agent for base-level design contracts procured through an Air Force contracting office.

Design Deficiency—Consists of either design errors or omissions. Examples of design deficiencies for which potential A-E liability should be evaluated:

- Conflicts between the plans and specifications, among the plans, or among the specifications.
- Designs which result in inadequate structures or systems to support necessary loads, carry necessary fluids or power, or provide sufficient heating or cooling, or are in any way insufficient to perform their intended functions.
- Omission of architectural, structural, mechanical, electrical, or other component necessary for the safe, efficient, and proper functioning of the designed item.
- Omission of specifications or plans necessary to properly instruct construction contractors during their contract performance.

Design Manager (DM)—The Air Force organization designated to manage the design, provide Air Force interface with the design agent, and provide updates on design milestones to the Air Staff and major commands for specific projects.

Financial Completion (FC) Date—The date the disbursing agent pays (expenses) the final projects bills.

Health Facilities Office (HFO)—Field representative of the Surgeon General during design and construction of medical facilities.

Host Major Command—The organization with real estate responsibility for the installation on which a project constructed.

Inspection—The construction agent's review of all phases of the construction work to ascertain quality or state of work and to determine compliance with plans and specifications and contract provisions. This includes, but is not limited to, such items as checking layout of the construction in the field and safety compliance; inspecting workmanship and materials to determine conformity with contract documents; reviewing laboratory tests and analyses of materials; completing and submitting field and progress reports; and checking monthly and final estimates as a basis for contractor payment.

Lost Design—That portion of design cost for work which is deleted or redesigned at additional cost. Scope not awarded (such as additive bid items) and changes in criteria, siting, and requirements usually result in lost design. Lost design is not reported if the project is canceled and reported as breakage.

Management Reserve Account—Contingency funds used to support modifications in a construction contract resulting from user changes or other changes directed by the construction manager.

Military Construction Program (MILCON)—The program approved annually by the Congress in the Military Construction Appropriation Act.

Physical Completion (PC) Date—The date the project is physically complete and all deficiencies listed on the reverse side of DD Form 1354 have been corrected.

Attachment 2**SAMPLE ETL FORMAT**

NOTE: The sample ETL format in this attachment identifies the major topic areas and the sequence in which they should appear in most ETLs. However, to maximize the flexibility of the ETL system, you can modify the format for particular situations. Items 1, 2, and 6 must appear in all ETLs, in the sequence shown here, and the distribution statement must appear at the bottom of the first page only.

HQ AFCEA/EN

Engineering Technical Letter (ETL) 93-XX: (Title)

See Distribution

1. PURPOSE. Brief Summary.
2. APPLICATION.
 - 2.1. Authority (policy directive, executive order).
 - 2.2. Effective date (calendar date and/or program fiscal year).
 - 2.3. Ultimate recipients.
 - 2.4. Coordination with key organizations.
3. REFERENCED PUBLICATIONS. (Optional)
4. DEFINITIONS. (Optional)
5. SPECIFIC REQUIREMENTS. You may develop the format of this section to accommodate individual requirements, particularly in long or complex ETLs. Major paragraphs require descriptive titles. Make text brief, clear, and to the point.
6. POINT(S) OF CONTACT. Name, office symbol, telephone.

DENNIS M. FIRMAN, PE 3 Atch

Director, Systems Engineering 1. Distribution List

HQ Air Force Civil Engineer 2. ETL Index

Support Agency 3. Technical Details (if required)

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

Attachment 3**SAMPLE TECHDATA FORMAT**

HQ United States Air Force Office of the Civil Engineer

Air Force Civil Engineer Techdata

Techdata #AFCESA/EN 93-1 High-Efficiency, Zero-Pollution Coal Boilers

*Number Techdata sequentially within functional areas, with the specific technology described clearly identified. RD&A Techdata carry the number of the originating activity; for example, AL/EQ 93-1 (Molten Metal Reduction of Hazardous Materials).

Purpose: (Brief Summary).

Application and Benefits: (Summarize).

(If a research project, provide forecast of availability. If a new item of equipment or a newly available process, identify acquisition options for CEs.)

References and Documentation: (Technical Reports).

Functional Area Manager: (Name, Organization, Telephone Number).

(If applicable:)

Research Project Officer: (Name, Organization, Telephone Number).

(Photographs or professional drawings must briefly, simply, and clearly illustrate the subject of the Techdata sheet.)

Direct Communications with Field Activities. Civil Engineering field activities and AF/CE functional managers may communicate directly with each other. The Civil Engineer will provide technical information to major commands and their field activities using ETLs and Techdata.

ETLs (XX-XX) provide field activities with safety, reliability, and applications data essential to sustaining air base operability.

Civil Engineer Techdata (XX-XX) provide field activities with forecasts of emerging technologies from DoD to Air Force research, development and acquisition which apply to any area of field-level civil engineering.

HQ AFCESA summarizes ETLs and Techdata in The Civil Engineer (XX-XX), the funded newspaper serving the AF/CE community.